

**PLASMA IMMERSION ION IMPLANTATION SYSTEM INCLUDING AN
INDUCTIVELY COUPLED PLASMA SOURCE HAVING LOW DISSOCIATION
AND LOW MINIMUM PLASMA VOLTAGE**

5

ABSTRACT

A system for processing a workpiece includes a plasma immersion implantation reactor with an enclosure comprising a side wall and a ceiling and defining a chamber, and a workpiece support pedestal within the chamber having a workpiece support surface facing the ceiling and defining a process region extending generally across the wafer support pedestal. The reactor includes a gas distribution apparatus for introducing a process gas containing a first species to be ion implanted into a surface layer of the workpiece, and inductively coupled source power applicator, and an RF plasma source power generator coupled to the inductively coupled source power applicator for inductively coupling RF source power into the process zone. The reactor further includes an RF bias generator having an RF bias frequency and coupled to the workpiece support pedestal for applying an RF bias to the workpiece. The system further includes a second wafer processing apparatus, and a wafer transfer apparatus for transferring the workpiece between the plasma immersion ion implantation reactor and the second wafer processing apparatus.